REMARKS

Attached hereto is a Request for Extension of Time and the appropriate fee.

The present invention is in the highly competitive field of the manufacturing of plasma display panels and is directed to improvements in the method of manufacturing such display panels to provide improved performance in an economical manner. The present invention discloses a number of embodiments which can protect the phosphorus layers and lower the production time, for example, by lessening the time of vacuum pumping over that of a conventional procedure by 50%. Contaminant gases such as those resulting from water absorption and the release of gases from heated binding material are dealt with in a manner to increase the life of the phosphorus layers.

As can be seen from the cited prior art, the desire to provide improved processes for producing plasma display panels has existed for a substantial period of time yet only recently have plasma display panels been provided at a cost to come within the purchasing power of the average consumer. The present invention discloses methods to increase both performance and economy of production in accordance with these competitive demands.

As noted in the present invention, a sandwich or envelope of a face plate and back plate with an appropriate array of electrodes, partition walls and active phosphorus layers can be placed within a heating furnace and baked at temperatures lower than a softening temperature of a sealant layer. Vacuum pumping can be utilized to evacuate the envelope as the sealing material closes the periphery of the envelope forming the display panel. Impurities, such as absorbed moisture and gases from the binding material that is burnt out during the baking step, can be removed. A sealing material can be heated to a softening position to enable the sealing procedure to be effectuated while a lower pressure is created within the envelope so that a higher

external pressure can create forces for pressing the face plate and the back plate together during the sealing step.

A discharge or cleaning gas can be introduced for a predetermined period of time to assist in the removal of gaseous impurities that may be absorbed on the interior walls of the envelope. The vacuum pumping can further occur after the sealing material has set and the temperature is being lowered to ambient temperature to enable a final production step of introducing a discharge gas into the envelope. As can be appreciated, the initially sealed display envelope can be filled with a cleaning gas after being evacuated and then re-evacuated one or more times in exhausting steps to remove contaminants. It is further possible to exhaust any impurity gases within the envelope effectively even if only one exhaust hole using a small amount of cleaning gas is utilized in accordance with the present invention, see page 23, line 12 through page 24, line 11 and also page 25, lines 2-12.

As set forth in Claim 1, an envelope forming step of forming an envelope with a first plate and a second plate is followed with a sealing step for sealing the envelope with a sealant along the outer edges of the first and second plates. Gas is exhausted from the envelope which can also assist in applying a force resulting from a greater exterior pressure to assist in the sealing step. Finally a filling step can be provided for filling the envelope with a discharge gas.

In the exhaust step, the envelope is evacuated to assist in removing contaminants as noted in our specification and then subsequently a cleaning gas can be introduced, such as a dry air, that assists in maintaining the effectiveness of the phosphorus layer without introducing contaminants. The envelope can then be re-evacuated prior to the filling step with a discharge gas.

Despite the long time period in which a number of highly skilled engineers and scientists have attempted to improve a PDP production, the features set forth in Claim 1 have not been taught nor rendered obvious by any of the applied or cited references.

The Office Action rejected claims 1, 2, 5, 6, 9, 10, 13, 14, and 41, 49 over a combination of the *Betsui et al.* U.S. Patent No. 5,938,494 in view of the *Inoue et al.* U.S. Patent No.: 6,236,159.

The *Betsui et al.* reference recognized a specific problem in the use of a protective film such as magnesium oxide in a plasma display panel. The problem being that the protective film easily reacts with moisture or carbon oxide, such as carbon dioxide in the air, to produce a denaturalized layer which is formed on a surface of the protective film. It then becomes necessary to heat treat the panel to about 350° centigrade to decompose this denaturalized layer and to further discharge impure gases from inside the panel. Specifically, *Betsui et al.* taught a formation of a temporary protective film to prevent a denaturalized layer from being formed on the protective film. Basically a protective film was formed as shown in Figure 3 in a chamber and the substrate was then transferred into a high vacuum chamber 53 and then subsequently transferred into a temporary protective film forming chamber 54 where silicon nitride can be applied by a vacuum vapor deposition method in an atmosphere of argon and nitrogen. Subsequently the panel is removed and presumably exposed to atmospheric air without any concern about contamination of the underlying protective film.

As disclosed, a sealing material of a low melting glass having a lower heat resistance than conventional sealing media can be used, see Column 2, lines 47-51, because the temporary protective film eliminates the heating step of 350°C. The rear substrate is then provided with electrically conducted metal film by a sputtering technique and address electrodes as coated with

an insulating layer of a low melting glass. The barrier ribs are then formed in the insulating layer again of a low melting glass see Column 5, lines 43-49. A fluorescent paste is applied between the barrier ribs and then finally the rear substrate and the front substrate are positioned to face each other. Presumably this would be the equivalent of the envelope forming step of Claim 1 of the present invention.

As further noted in Column 5, the substrates are heated at a relatively low temperature so that the sealing medium will melt to stick the front substrate to the rear substrate. Gases are discharged from inside the panel and an "electric" gas is introduced into the panel to be able to generate a plasma between both of the sustained electrodes so that the SiN film is removed from the surfaces between the sustained electrodes through an etching procedure. The gas inside the panel is removed and subsequently a discharge gas is introduced.

The Office Action recognized that the *Betsui et al.* reference did not teach the advantages of the present invention and certainly did not teach the advantages set forth relative to the operating parameters disclosed in our Figures 4-6 in the present specification. To address this deficiency, the Office Action sought to employ the *Inoue et al.* U.S. Patent No. 6,236,159 and particularly specified the teaching in Column 6, line 66 through Column 7, line 24 of the *Inoue et al.* disclosure.

The *Inoue et al.* reference was primarily directed at the construction of barrier ribs and blocking ribs to direct the flow of gases through the rows of barrier ribs. As set forth in Column 5 the barrier ribs could be made of any known material conventionally used and the sealing member was also made of any known sealers commonly used for conventional gas discharge panels, see Column 5, lines 36-40. A cleaning gas and a discharge gas was used for expelling impurity gases that would emanate from the barrier ribs and the sealing member during the

sealing of the periphery of the panel see, Column 5 line 59-65. A pair of vent holes could be arranged at different locations, for example, one side of the panel or at diagonally opposite portions of the panel. *Inoue* teaches removing impurity gases during a heating or electric discharge between discharge electrodes by introducing a discharge gas or a cleaning gas into the panel. As can be readily determined *Inoue et al.* is addressing a panel or envelope after there has been a sealing of the periphery of the front and back plates. It is not suggesting an evacuating of the envelope with a subsequent filling of the envelope with a cleaning gas and then a re-evacuation of the envelope before a discharge gas is charged into the final panel.

In the operation of the *Inoue et al.* disclosure, a cleaning gas is introduced when the PDP is placed within an oven. The temperature of the oven is defined with regards to Figure 18, which simply provides a profile and no scale to the temperature range.

Since as noted in Col. 15, Lines 15-22, one of the impurity gases is H_2O, it would appear that the temperature is above 100°C and it is assumed that the temperature that is applied is the minimum temperature to release gases. As noted in Col. 14, Lines 16-18:

> "Therefore, the PDP1 is kept at the predetermined temperature to cause the impurity gases to be released from the barrier ribs and the like in the PDP1".

In this environment, an inert cleaning gas is introduced to expel the impurity gases released from the barrier ribs. In this evacuation and cleaning gas introduction process, the oven is controlled to cool the PDP to room temperature and the discharge gas is introduced into the PDP at this room temperature.

In the fourth evacuation and gas introduction process of *Inoue et al.*, a variation of the procedure is disclosed wherein the PDP is placed into an oven with the same panel temperature

control as in the earlier first embodiment with the exception that the electric discharge occurs with the cleaning gas being introduced in the PDP at the same temperature for the impurity gas to be released (see Col. 16, Lines 9-19). Presumably, the electric discharge assists in readily releasing impurity gases that may be adsorbed in the surface of the protective layer. As also taught in the *Inoue et al.* reference, cleaning discharge electrodes can be positioned in the peripheral space area and then employed to ionize the inert gas for removing impurity gases. After the cleaning process has occurred, the PDP is cooled to a room temperature, the evacuation valve is closed, and discharge gas is introduced into the PDP to the desired internal pressure for the operation of the PDP.

The *Inoue et al.* reference teaches a particular arrangement of gas flow barriers that attempt to restrict the flow pattern in the peripheral space with a gap smaller than the inter-rib spaces to maximize flow through the rib spaces. Additionally, a purging of impurity gases occurs in a cleaning step with a PDP heated to a temperature to release impurity gases and, as disclosed in one or more of the embodiments, a discharge voltage is applied to an electrode, such as cleaning electrodes, in the peripheral spaces to ionize the cleaning gas to further assist in removing the impurity gases. This teaching is best described by the *Inoue et al.* patent itself as follows in Col. 8, Lines 34-40.

> "This arrangement offers the following advantages. Since the panel can satisfactorily be evacuated even at a low temperature by causing the electric discharging in the electric discharge space in the panel, the time required for the evacuation and gas introduction process can be shortened in comparison with the prior art, thereby improving the productivity".
>
> (underline added)

The *Inoue et al.* reference also discloses a plasma display panel having at least two vent holes wherein the plasma display panel is cleaned by a cleaning gas introduced through one of the vent holes to flow inside the plasma display panel and be exhausted through the other vent hole. The temperature is then lowered to room temperature, the cleaning gas is exhausted and a discharge gas is introduced into the plasma display panel, see Column 13, line 65 through Column 15, line 22 in the disclosure of Figure 9. *Inoue et al.* does not teach a modification of the *Betsui et al.* reference where an envelope is filled with a cleaning gas after being evacuated and then re-evacuated in the exhaust step as set forth in our claims. The present invention can further be accomplished with only one hole for both filling and exhausting and the amount of cleaning gas can be conserved.

The Office Action also rejected claims 3-4, 7, 8, 11, 12, and 15-40 over a combination of *Betsui et al.* and *Inoue et al.* when taken further in view of the *Park et al.* U.S. Patent No. 6,332,821. The Office Action noted that the *Inoue* reference and the *Betsui et al.* reference did not disclose setting a pressure within the envelope lower than the pressure outside the envelope and certainly did not disclose it for the purposes of assisting a sealing step.

It should be particularly noted that the *Park et al.* reference would teach away from the *Betsui et al.* temporary protective film. *Betsui et al.* specifically taught using an unconventional low temperature material for the sealing material and for the barrier ribs could be employed and that the protective film layer would not have to be treated at temperatures of 350° centigrade or higher. *Inoue et al.* also taught a low temperature production.

The *Park et al.* reference, however, specifically teaches raising a heating chamber to a temperature of 400° C to 450° C as noted on Column 5, lines 10-11.

There is no teaching in the *Park et al.* to create a differential pressure between the heating chamber that surrounds the envelope and the internal pressure within the envelope. Rather, both are evacuated and heated at the same time to permit the frit glass 23 to melt at a temperature above 400° C. When melted, purportedly the substrates are bonded "by the pressure of the clips" see Column 5, lines 18-19. Thus a conventional mechanical pressure apparatus is used. The *Park et al.* reference directly teaches away from the principle *Betsui et al.* disclosure of unconventional low heat material. Finally, there would be no reason to use the temporary protective film of the *Betsui et al.* reference since the *Park et al.* reference requires a high temperature heating to burn out contaminating gases and to melt the frit glass at a temperature above 400° C.

> [I]t is generally settled that the change in prior art device which makes the device inoperable for its intended purpose cannot be considered to be an obvious change
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> *Hughes Aircraft Co. v. United States*, 215 U.S.P.Q. 787, 804 (Ct.Cl. Trial Div. 1982)

In combining these three references to reject each of our present outstanding claims it further appears that the limitations of our dependent claims have not been considered. For example, dependent Claim 33 clearly defines that a pressure is set within the envelope lower than the pressure outside of the envelope when the sealing material is heated between a temperature of the softening point and the melting point of the sealant. Features such as this are set forth in dependent claims and have not been adequately addressed by the combination of references and this is particularly true since these references teach away from each other to a person of ordinary skill in this field. It appears that the Office Action is assuming some source of a teaching reference equivalent to that of our present application that is not suggested by any of the three references of record.

To establish a prima facie case of obviousness, the examiner must demonstrate that one of ordinary skill in the art would have found both suggestions to construct the claimed structure, and a reasonable expectation of successfully doing so, in the prior art. *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). Moreover, the examiner bears the initial burden of supplying the factual basis for his position. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Although the examiner may take official notice of technical facts outside of the record to fill the gaps that might exist in the evidentiary showing to satisfy his burden, such asserted technical facts must be "capable of such instant and unquestionable demonstration as to defy dispute." *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970). However,

> [a]ssertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given, in the Patent Office, the opportunity to challenge the correctness of the assertion . . . [a]llegations concerning "knowledge" of the prior art, which might be peculiar to a particular art, should also be supported and the appellant similarly given the opportunity to make a challenge.

Ahlert, 424 F.2d at 1091, 165 USPQ at 420-1.

It is recognized that the task of examining an application requires the Examiner to become familiar with the invention and then to seek references that would be obvious to a person of skill in the field. This is a difficult assignment since the temptation of using hindsight as a substitute for a teaching reference is an inherent problem. Thus, a strict objective standard should be utilized and rejection should not be based upon a selective picking of teachings from a reference while ignoring or excluding the other portions of the references that would in fact fairly teach a person with skill in the art what that reference was actually seeking to accomplish.

By requiring a comprehensive teaching reference this problem can be addressed. It is believed, however, that there is not such a teaching reference and that *Betsui et al.* reference would only be viewed by a person skilled in this field as teaching a temporary protective film.

> It is impermissible within the frame work of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art.
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> In re Wesslau, 147 USPQ 391, 393 (CCPA 1965)

It is respectfully requested that a proper teaching reference be cited if the present rejection is to be maintained.

It is believed that our present claims distinguish over any combination of the prior art and the case should be allowed. If the Examiner believes a telephone interview will help further prosecution of this case he is respectfully requested to contact the undersigned attorney at the listed phone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 3, 2003.

By: Sharon Farnus

Sharon Farnus

Signature

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Very truly yours,

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